Method for Measuring Performance of Portable Household Electric Room Air Cleaners

AHAM AC-1-2018

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

Leadership ➤ Knowledge ➤ Innovation

1111 19th Street NW ➤ Suite 402 ➤ Washington, DC 20036
f 202.872.9354 www.aham.org

PREFACE

The Association of Home Appliance Manufacturers (AHAM) develops standards in accordance with AHAM's "Policy and Procedures Governing Technical Standards" which states:

> "AHAM Standards shall be in the best interest, mutually, of consumers who use appliances, the industries which provide and service appliances, and other interested parties. They shall relate to actual use conditions, be technically and scientifically sound."

Use or observance of AHAM standards is voluntary.

This standard contains test procedures which may be applied to any brand or model of portable household electric room air cleaners within the stated confines of the standard's limits of measurability for measuring performance. Results of tests in accordance with this standard may be publicly stated.

With regard to safety, AHAM recommends that all appliance products - both major and portable appliances - manufactured or marketed in the United States be submitted to an appropriate independent Nationally Recognized Testing Laboratory for inspection and listing in conformance with the safety standards and procedures followed by such laboratories. The relevant standards for portable household electric room air cleaners are UL 867, "Standard for Electrostatic Air Cleaners" and UL 507, "Standard for Fans."

The annexes to this standard are included for informational purposes only unless the annexes are noted as normative.

AHAM welcomes comments and suggestions regarding this standard. Any standard may be reviewed and improved as needed. All standards must be updated or reconfirmed at least every five years. Any interested party, at any time, may request a change in an AHAM standard. Such request should be addressed to AHAM's President, and should be accompanied by a statement of reason for the request and a suggested alternate proposal.

This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of any regulatory limitations prior to use.

TABLE OF CONTENTS

1. PURPOSE

This standard method establishes uniform, repeatable procedures and standard methods for measuring specified product characteristics of portable household electric room air cleaners.

The standard methods provide a means to compare and evaluate different brands of portable household electric room air cleaners regarding characteristics significant to product use.

The standard methods of measurement are not intended to inhibit improvement and innovation in product testing, design or performance.

2. SCOPE

This standard method applies to portable household electric room air cleaners as defined in Section 3.

This standard method includes definitions and safety characteristics of portable household electric room air cleaners of the types indicated.

This standard method measures the relative reduction by the air cleaner of particulate matter suspended in the air in a specified test chamber. It also prescribes a method for measuring the operating power and standby power of the air cleaner.

This standard method has defined limits of measurability based on the statistical accuracy of the methods. Based on a 95% confidence limit (2 standard deviations), a CADR cannot be distinguished between zero (0) and a CADR rating less than those CADR limits shown below. Therefore, the standard only applies to air cleaners with minimum CADR ratings of:

Dust	CADR = 10 cfm
Cigarette smoke	CADR = 10 cfm
Pollen	CADR = 25 cfm

The maximum CADR values are determined based on theoretical maximum limits. The theoretical maximum limits are determined by the maximum number of initial available particles, the acceptable minimum number of available particles, an average background natural decay rate (from statistical study), the size of the test chamber, and the available minimum experiment time. CADR values for dust and cigarette smoke greater than those listed will not have the necessary statistical data required by this method. CADR values for pollen greater than those listed will not have the necessary statistical data required by this method. CADR values for pollen approaching that listed are normally determined by pooling of the test value data determined under this method. Therefore, the standard only applies to air cleaners with maximum CADR ratings of:

Dust	CADR = 400 cfm
Cigarette smoke	CADR = 450 cfm
Pollen	CADR = 450 cfm

The precision of the Standard as based on a 0 CADR air cleaner expressed as 2 standard deviation limits (95%) are:

Dust	CADR = ± 10 cfm
Cigarette Smoke	CADR = ± 10 cfm
Pollen	CADR = ± 25 cfm

3. DEFINITIONS

3.1 Portable Household Electric Room Air Cleaner ("Air Cleaner")

An electric appliance with the function of removing particulate matter from the air and which can be moved from room to room. Herein referred to as "air cleaner."

3.1.1 Air Cleaner - Floor Type

Floor type air cleaners are designed to stand alone on the floor of a room and are designated as stand-alone floor models by the manufacturer. Appliances of this type are tested on the floor facing the test window as close to the center of the test chamber as possible.

3.1.2 Air Cleaner - Table Type

Table type air cleaners are designed to set on a table or counter by the manufacturer. Appliances of this type are tested on the table stand facing the test window at the center of the test chamber.

3.1.3 Air Cleaner - Wall Type

Wall type air cleaners are designed either to attach to a wall and are designated as wall mountable by the manufacturer or as a plug-in air cleaner. A wall type air cleaner must include appropriate wall mounting brackets or specifically designated instructions to mount the air cleaner integrally to the wall (i.e. not a shelf). Appliances of this type are tested on the wall mount stand facing the test window placed at the center of the test chamber (refer to Annex G).

3.1.4 Air Cleaner - Combination Type

Combination type air cleaners are designed to operate in one or more orientations/positions (floor, table, wall) as designed by the manufacturer. A combination type air cleaner may be tested at the center of the test chamber facing the test window on the floor, table, or wall mount stand, according to how it has been designated by the manufacturer (See 3.1.1, 3.1.2 and 3.1.3).

3.1.5 Air Cleaner - Ceiling Type

Air cleaner appliances designed to be mounted on the ceiling are considered outside the scope of this method as defined in Section 3. Uniform testing practices and statistical examination of such appliances have not been conducted.

3.1.6 Air Cleaner - Plug-In Type

A fixed location air cleaner directly connected to an electric receptacle (outlet) by means of direct plug-in (no electric cord). Appliances of this type are tested at the lower level electrical receptacle of the plug-in type test stand facing the test window as shown in Annex G.

3.2 Design Characteristics of Portable Household Electric Room Air Cleaners

3.2.1 Fan with Filter

Air cleaners that operate with an electrical source of power and which contain a motor and fan for drawing air through a filter media.

3.2.2 Fan and Electrostatic Plates

Air cleaners that operate with a fan and incorporate electrically charged plates or wires to electrostatically collect particulate matter. Such devices may include a filter(s).

3.2.3 Fan Filter with Ion Generator

Air cleaners that incorporate an ion generator in addition to a fan and filter.

3.2.4 Ion Generator

Air cleaners that incorporate an ion generator only.

3.2.5 Hybrid

Any air cleaner employing a combination of the above definitions of fan with filter, electrostatic plate/wire, and ion generator.

3.2.6 Basic Model

A basic model is a single unit that represents a unique performance design configuration. Models identical to the basic model in functional design, performance characteristics and CADR values are considered derivative models including models of different brand names manufactured by the same Licensee. Collectively these models are called a "Basic Model". Different brand-name models may be in a Basic Model. A unit shall not be designated as a separate basic model if it has the same CADR as a designated basic model but differs from it only in decorative treatment; rather, it shall be considered a derivative of the basic model.

3.2.7 Derivative Model

A model that differ from another model in the base model family by voltage, cosmetics or designation but has the same CADR value. The performance of a derivative model is shown to be statistically equivalent to the other models in the base model family.

3.2.8 Other Types

A device that has the stated capability to reduce the concentration of particulate matter in a room. Such devices do not have to contain a fan and can incorporate any of the particle removal methods noted above.